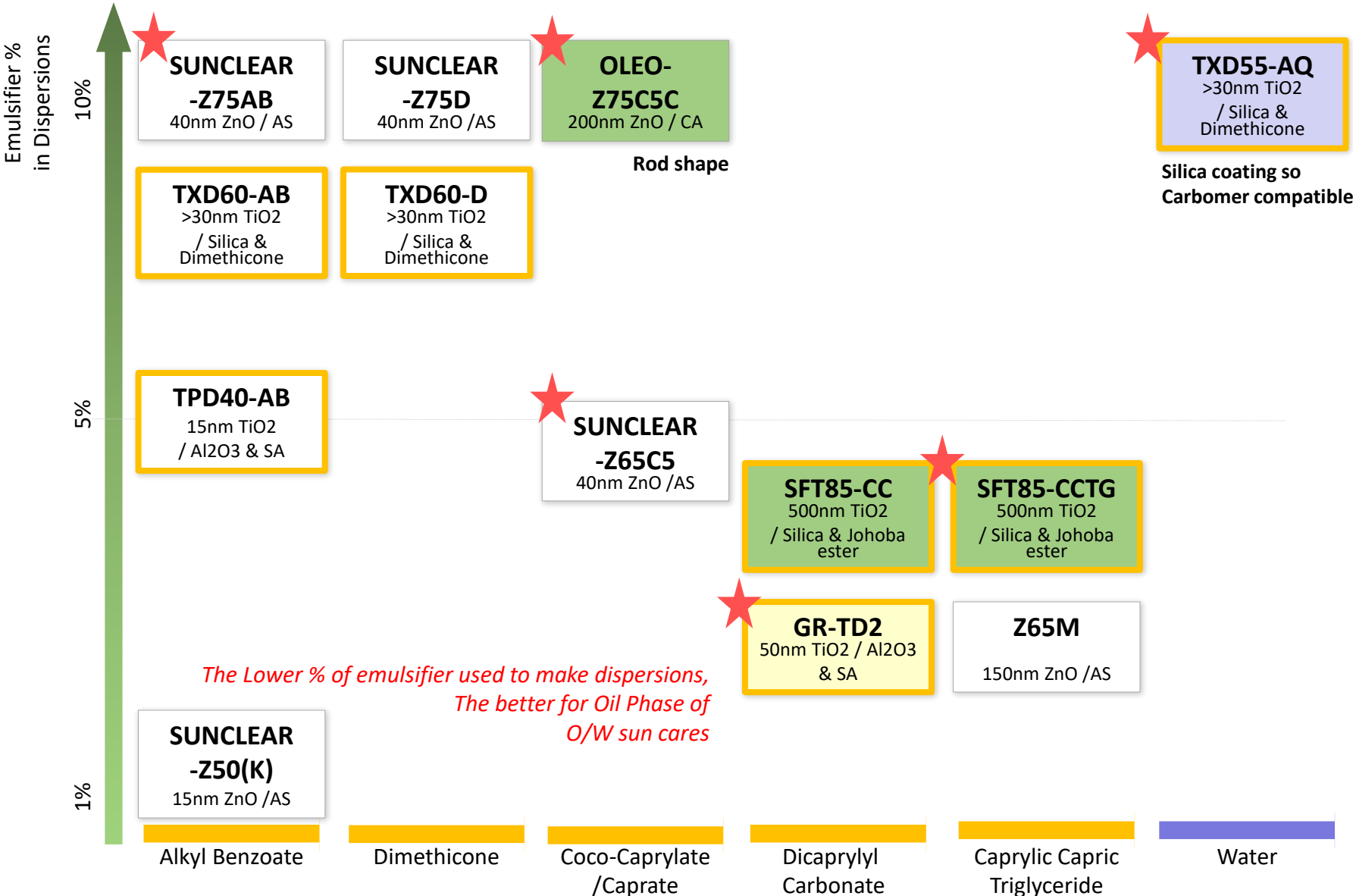


TiO₂ & ZnO Dispersions



TiO₂ Dispersion Overview

	TXD55-AQ	TPD40-AB	TXD60-D	TXD60-AB	GR-TD2	SFT85-CCTG	SFT85-CC
Carrier	Water	Alkyl Benzoate	Dimethicone	Alkyl Benzoate	Dicaprylyl Carbonate	Caprylic Capric Triglyceride	Dicaprylyl Carbonate
Net TiO ₂ %	46%	35%	48%	56.5%	30%	48%	48%
TiO ₂ coating	Silica & Dimethicone	Alumina	Silica & Dimethicone	Silica & Dimethicone	Aluminum Hydroxide & Stearic Acid	Silica & Jojoba Esters	Silica & Jojoba Esters
Dispersing agent	Polysorbate & Oleth-10	Polyhydroxy stearic acid	PEG-10 Dimethicone	Polyhydroxy stearic acid	Polyglyceryl-6 Polyricinoleate	Polyhydroxy stearic acid	Polyhydroxy stearic acid
Critical wavelength (nm)	-	364nm	385.8	380.5	384.3	388.2	387.4
Remarks	SCCS grade TX-85 used For water phase	The most Transparent	SCCS grade TX-85 used	SCCS grade TX-85 used	EWG COSMOS RSPO	EWG COSMOS RSPO	EWG COSMOS RSPO

ZnO Dispersion Overview

	SUNCLEAR -Z50(K)	SUNCLEAR- Z75AB	SUNCLEAR- Z75D	SUNCLEAR- Z65C5	Z65M	OLEO- Z75C5C
Carrier	Alkyl Benzoate	Alkyl Benzoate	Dimethicone	Coco-Caprylate /Caprate	Caprylic Capric Triglyceride	Coco-Caprylate /Caprate
Net ZnO %		76%	72.5%	60%	64%	72%
Crystal size (nm)	15	40	40	40	150	200
Surface treatment	Triethoxycaprylsilane	Triethoxycaprylylsilane	Triethoxycaprylylsilane	Triethoxycaprylylsilane	Triethoxycaprylsilane	Cetyl Alcohol
Dispersing agent	Polyhydroxy stearic acid	Polyhydroxy stearic acid	PEG-10 Dimethicone	Polyhydroxy stearic acid	Polyhydroxy stearic acid	Polyglyceryl-6 polyhydroxystearate & Polyglyceryl-6 Polyricinoleate
Remarks		-	-	-		EWG COSMOS RSPO
Critical wavelength (nm)		377.9	378.3	379.2		383.8

Chemical Sunscreen Free related regulations

FDA GRASE proposal & Island Ban Driving 'Chemical Sunscreen Free' trend

FDA GRASE Proposal

FDA made **GRASE (Generally Recognized As Safe and Effective)** proposals for UV Filters(2019.2.22)

Classification	UV Filters
GRASE	Zinc Oxide, Titanium Dioxide
Not GRASE	PABA(Para-Aminobenzoic Acid), Tolamine Salicylate
Pending	Cinoxatyne, Dioxybenzone, Ensilizole, Homosalate, Meradimate, Octinoxate, Octisalate, Octocrylene, Padimate, Sulisobenzene, Oxybenzone, Avobenzene



CNN, 2019, May 7th

CNN

The study, conducted by FDA, found that sunscreen chemicals reach into people's blood rather quickly and reach levels high enough to warrant further testing on the substances' safety.

Island Ban

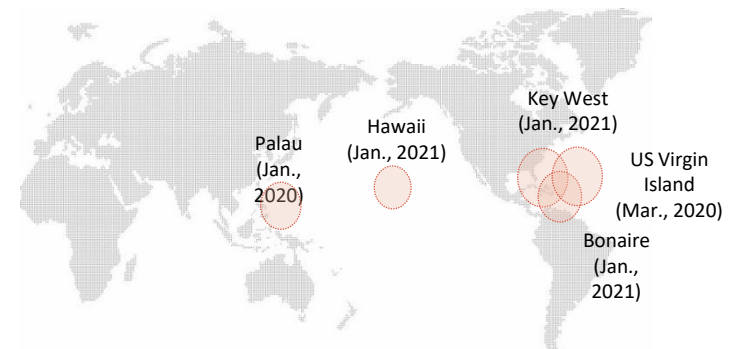
Hawaii bans sunscreens that harm coral reefs

The sale or distribution of over-the-counter sunscreens containing **oxybenzone and octinoxate**, which help filter UV rays, will be prohibited **From Jan. 1st 2021**.



More islands will Enact the Sunscreen Ban worldwide

Palau (January 2020), US Virgin Island (March 2020), Bonaire, Netherlands (January 2021)



US sun care makers will not prepare Hawaii-only sun care but nationwide products that covers all of USA including Hawaii

As Octinoxate is very powerful and most cost effective chemical UV Filter, Banning of Octinoxate by Island ban will induce full-scale sun care products reformulation opportunities in 3~5 years,